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Research Article

Can Workplace Physical Activity of Blue Collar Job be a Blessing in Disguise?

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Abstract

Objective: The aim of the study was to assess the prevalence and correlates of hypertension among class IV (Blue-collar) workers in a medical college of New Delhi.

Methods: A cross-sectional study, enrolling all the class IV workers of the institute was conducted. Each subject was interviewed for socio-demographic and risk factors like smoking, alcohol intake, salt consumption, family history etc. This was followed by examination for blood pressure and anthropometry. Data was analysed on MS excel. Chi square test and student's t test were used for comparison and $p<0.05$ was taken as significant.

Results: The total number of class IV employees studied was 204, 87% were males and 13% were females. The mean age of the employees was 41.6 ± 0.32 yr. and the range was from 21 years to 62 years. The mean age of the female employees (47.3 ± 3.6 yr.) was significantly higher ($p<0.005$) than that of the males (40.7 ± 1.6 yr.) and 69% of females were post-menopausal. The overall prevalence of hypertension was found to be low at 8.8% and even lower among males (6.1%). Although the prevalence among females was higher (26.6%), it was still low for this age and social group females (70% were post-menopausal). Majority of the hypertensive (71% female and 78% male) fell in grade 1 of hypertension. Age, BMI, smoking, alcohol intake, excess salt and regular consumption of hydrogenated fat (Vanaspati ghee) were not associated with increased risk of HT, even though Waist Hip Ratio, family history and menopause were.

Conclusion: The prevalence of hypertension was found to be unusually low and the risk did not increase with some of the known risk factors. One of the probable reasons may be the pattern of their work related physical activity. It is suggested that further research is encouraged to explore this link.

Keywords

Class IV workers; Hypertension; Work related physical activity

Introduction

Hypertension has assumed epidemic proportions in developing countries like India [1-4]. It is a major risk factor for cardiovascular disease (CVD).

The trouble with hypertension is that even though it is easy to diagnose and early control will definitely decrease the cardiovascular morbidity and mortality, majority remain asymptomatic and hence undiagnosed. Most cases can be identified only through routine screening. Hence there is a need to identify high risk groups which need to be a priority for such screening.

Certain sedentary and high stress jobs have been linked to hypertension and hence most likely to have some sort of screening in place [1]. Very few studies have evaluated the risk of hypertension in other occupational groups in India. One such underserved and neglected group is that of class IV (blue collar) workers.

Class IV workers are defined as semi-skilled manual workers (Blue-collar workers), and in the hospital setup refers to workers who are involved in duties of waste collection and waste disposal.

Jobs expected from class IV workers in India, irrespective of gender, are cleaning floors, dusting, carrying goods etc. This work involves walking around the building, climbing stairs, carrying loads etc. hence can be classified as involving moderate physical activity throughout the course of working hours [5].

The risk of hypertension has not been adequately evaluated in this group. We therefore conducted the present study to assess the prevalence and correlates of hypertension among class IV (Blue collar) workers in a medical college of New Delhi

Methods

A cross-sectional survey among all the class IV employees of a medical college in New Delhi was conducted after ethical approval and permission from the institutional authority. The list of workers was obtained from the contractor and each worker was contacted personally. Each subject was informed regarding the purpose of the study and verbal consent was taken. Each study subject was interviewed, examined and their blood pressure was measured using a sphygmomanometer. Three readings were taken after 15 minutes of rest and the average was taken.

The information regarding age, education, socio-economic status, total family income etc. were recorded using a structured questionnaire. Data regarding the presence or absence of risk factors including smoking, alcohol intake, on-table salt intake, use of hydrogenated fat (Vanaspati Ghee), family history etc. were collected.

Weight was recorded using a standard weighing scale kept on a firm horizontal surface, to the nearest 500 gm.

Height was recorded using a measuring tape to the nearest 1 cm while the subjects were requested to stand upright, without shoes, with their back against the wall, heels together and looking forward.

Body mass index (BMI) was calculated using the formula of weight (kg)/height $(m)^2$. A person was considered to be obese if body mass index ≥ 30 kg/m^2 and overweight when BMI ≥ 25 kg/m^2. Waist circumference was measured to the nearest 0.1 cm at the midpoint between costal margin and iliac crest using a non-stretchable measuring tape. Hip circumference was measured at the level of the greater trochanters (widest portion of the hip) to the nearest 0.1 cm

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by a measuring tape. Waist-hip ratio (WHR) was calculated as the ratio of waist circumference over hip circumference.

Waist-hip ratio >1 for males and >0.85 for females was defined as truncal obesity [6,7].

According to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure [6], each subject was classified as:

Normotensive (blood pressure 90-119/60-79mmHg);

Pre-hypertensive (120-139/80-89mmHg);

Stage I hypertensive (140-159/90-99mmHg); stage 2 hypertensive (160-179/100-109mmHg), or stage 3 (≥180/ ≥110) hypertensive.

Data was analysed using Microsoft Excel. Prevalence of HT and risk factors were expressed as percentages. Groups were compared using chi-square test and student's t – test. A value of $P<0.05$ was considered to be statistically significant.

Result

The total number of enlisted class IV (Blue-collar) workers was 204. All could be contacted and all consented for participation. Hence, the number of group D employees studied was 204, 87% were males and 13% were females. The age of the workers ranged from 21 years to 62 years. The mean age of the employees was 41.6 ± 0.32 yr. The mean age of the female employees (47.3 ± 3.6 yr.) was significantly higher ($p< 0.005$) than that of the males (40.7 ± 1.6 yr.) and 69% of females were post-menopausal.

Table 1 show the age and sex distribution of the workers.

A vast majority (96%) had not studied beyond school out of which 17% were illiterate. Among those who went to school, 90% left before completion. Most (93%) resided in overcrowded conditions.

The overall prevalence of hypertension among the workers was 8.8%.

The prevalence was significantly lower ($p< 0.001$) among the male workers (6.1%) compared to the female workers (26.6%).

Majority (total 78%; females 71% and males 78%) of the hypertensive subjects were in grade 1 hypertension, rest in grade 2 and none was found to be grade3 hypertensive.

Table 2 shows the prevalence of some of the risk factors for HT among the study population.

Table 3 demonstrates the status of association of various risk factors with presence of HT among the study population.

Discussion

The study was planned with the plain objective of measuring the prevalence of hypertension (HT) in this occupational group, but the overall prevalence was found to be surprisingly low at 8.8%. Further, the prevalence among the male population was even lower at just 6.1%.

The rates in the general population, for this socio-economic stratum (13% - 17% and a rising trend) though lesser than that for the upper strata, are still higher compared to these workers. Also, males are known to have a higher prevalence than females [1-4]. Even though the prevalence in the female workers was higher at 26.6%, these females constituted and older group of whom almost 70% were menopausal. Considering this, the prevalence among females was also low as the rates in general population are much higher (38% to 48%) for this age and socio-economic group women [3,4,8-11].

Also, a large majority of the hypertensive (71% female and 78% male) fell in grade 1 of hypertension.

Another striking feature was that some of the well-known risk factors for hypertension did not increase the risk among these workers. These factors were BMI (though WHR did!), smoking, alcohol intake, excess salt and regular consumption of hydrogenated fat (Vanaspati ghee). Even a non-modifiable factor like age did not increase the risk.

Table 1: Age and sex distribution of the class IV (Blue-collar) workers.

Age group (in completed years)	Males n (%)	Females n (%)	Total n (%)
20-30	34 (19.1%)	0	34 (16.7%)
30-40	40 (22.5%)	8 (30.8%)	48 (23.5%)
40-50	75 (42.1%)	4 (15.4%)	79 (38.7%)
50-60	25 (14.0%)	14 (53.8%)	39 (19.1%)
>60	4 (22.5%)	0	4 (2.0%)
Total	178 (100%)	26 (100%)	204 (100%)

Table 2: Prevalence of the risk factors among the study population.

Prevalence of modifiable risk factors			
	Males(n=178)	**Females (n=26)**	**Total (n=204)**
Alcohol consumption	85 (47.8%)	8 (30.8%)	93 (45.6%)
Smoking	101 (56.7%)	15 (57.7%)	116 (56.9.0%)
On table salt intake	100 (56.2%)	18 (69.2%)	118 (57.8%)
Use of hydrogenated vegetable oil (Vanaspati ghee)for cooking	134 (75.3%)	20 (76.9%)	154 (75.5%)
BMI > 25	47 (26.4%)	9 (34.6%)	56 (27.5%)
WHR: >1 in males ; >0.85 in females	83 (46.6%)	11 (42.3%)	94 (46.1%)
Prevalence of non- modifiable risk factors			
Age >40 yr.	104 (58.4%)	18 (69.2%)	122 (59.8%)
Menopause (Only females)	NA	18 (69.2%)	NA
Positive family history	23 (12.9%)	4 (15.4%)	27 (13.2%)

Table 3: Association of the known risk factors with hypertension among the study population.

Risk factor (RF)	Prevalence of HT among those having the RF	Prevalence of HT among those without the RF	P-value (chi-square test)
Modifiable risk factors			
Alcohol consumption	8/93 (8.6%)	10/111 (9.0%)	X^2= 0.01, p>0.05
Smoking	7/116 (6.0%)	11/88 (12.5%)	X^2= 2.6, p>0.05
On table salt intake	11/118 (9.3%)	7/86 (8.1%)	X^2= 0.09, p>0.05
Use of hydrogenated vegetable oil (Vanaspati ghee)for cooking	11/154 (7.0%)	7/50 (14%)	X^2= 2.2, p>0.05
BMI > 25	7/56 (12.5%)	11/148 (7.4%)	X^2= 1.3, p>0.05
WHR: >1 in males	9/83 (10.8%)	2/95 (2.1%)	X^2= 4.4, p<0.05
WHR: >0.85 in females	6/11 (54.0%)	1/14 (7.1%)	X^2= 5.2, p<0.05
Non- modifiable risk factors			
Age >40 yr.	8/82 (9.8%)	10/122 (8.2%)	X^2= 0.15, p>0.05
Menopause (Only females)	6/18 (33.0%)	1/8 (12.5%)	X^2= 4.3, **p<0.05**
Positive family history	8/27 (29.6%)	10/177 (5.6%)	X^2= 14.8, **p<0.001**

Nevertheless, the stronger predictors for HT viz. WHR, Positive family history [12] and menopause were seen to be associated with higher risk of HT even with such low levels of prevalence in this occupational group.

While the rates of HT across all classes of Indian population are reported to be high and still increasing [1-4], such a low prevalence and blunting of certain known risk factors including that of 'age', compels one to think of possible explanations. One possibility may be that the moderate activity spread throughout the working hours (which is an integral part of the job profile of this group) has helped protect them to some extent.

At least one more Indian study has found that an occupation involving moderate or greater physical activity was associated with lower risk of hypertension [13]. The best way of assessing the effect of physical activity on HT would be a follow-up study, tracking the development of HT in groups with differing levels of physical activity.

One such study done on a large scale in Finland, not only demonstrated the protective effect of physical activity against HT, but also showed that regular physical activity weakens the effect of BMI on HT. The risk was lowered in both the sexes, independent of age, smoking, alcohol intake, educational status and baseline systolic BP [14].

An ample number of studies have revealed that it is moderate intensity exercise that is more effective in lowering BP, compared to higher intensity [15]. The moderate intensity exercise needed to reduce the risk of HT need not always be a leisure time physical activity. Work and transportation physical activity can also reduce the BP and improve cardiovascular fitness.

Hence the total physical activity needs to be assessed, rather than focussing on one domain i.e. leisure time. The leisure time, occupational, transportation and household activity all contribute to physical activity level of an individual [16,17]. A study in Chicago demonstrated that the lack of leisure time physical activity was compensated by the work related activity in lower social groups [18]. A study in Korea also found that work related activity as one of the predictors of cardiopulmonary fitness as measured by maximal oxygen uptake [19]. The beneficial effect of physical activity has been proven to increase further if it is done in a fractionized manner rather than as a single session [20,21].

As an outcome of the above discussion, it seems that the fractionized and moderate, work-related physical activity, may have contributed to unusually low levels of HT in this occupational group of blue collar workers.

There has been inadequate research evaluating the beneficial effects of occupational physical activity on the cardiovascular fitness, especially in India. There is a need to conduct larger scale and prospective studies for establishing the link. If proved, this will make a case for conscious inclusion of moderate physical activity in other occupations too. An additional bonus would the fact that engaging in moderate exercise like activities and household work during midlife improves functioning in the old age too [22].

Conclusion

The prevalence of hypertension was found to be unusually low and the risk did not increase with some of the known risk factors. One of the probable reasons may be the fractionized and moderate physical activity characteristic of the blue-collar job. It is suggested that further research especially longitudinal studies should be conducted to explore this link.

References

1. Momin.M. H, V.K. Desai, A. Kavishwar (2011): A Study On Effect Of Life Style Risk Factors On Prevalence of Hypertension Among White Collar Job People of Surat. The Internet Journal of Occupational Health. 2011, 1: 1.
2. Panesar S, Chaturvedi S, Saini N K, Avasthi R, Singh A (2013) Prevalence and predictors of hypertension among residents aged 20-59 years of a slum-resettlement colony in Delhi, India. WHO South-East Asia J Public Health 27: 83-87.
3. Gupta R, Gupta VP, Sarna M, Prakash H, Rastogi S, et al (2003) Serial epidemiological surveys in an urban Indian population demonstrate increasing coronary risk factors among the lower socioeconomic status. J Assoc Physicians India 51: 470-477
4. Gupta R, Sarna M, Thanvi J, Rastogi P, Kaul V, et al. (2004) High prevalence of multiple coronary risk factors in Punjabi Bhatia community: Jaipur Heart Watch-3. Indian Heart J 56: 646-652.
5. Verma C, Vijaya K (2015) Musculoskeletal Morbidities In Class 4 Women Employees of a Tertiary Care hospital: Across-Sectional Survey Int J Physiother Res 3: 1048-1052.
6. Chobanian AV1, Bakris GL, Black HR, Cushman WC, Green LA, et al. (2003) Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 42: 1206-1252.
7. Waist Circumference, Waist-Hip Ratio (2012) Report of a WHO Expert Consultation. World Health Organization 8–11.
8. Gupta R, Gupta KD (2009) Coronary heart disease in low socioeconomic status subjects in India: "an evolving epidemic". Indian Heart J 61: 358-367.
9. Gupta R, Pandey RM, Misra A, Agrawal A, Misra P, et al. (2012) High prevalence and low awareness, treatment and control of hypertension in Asian Indian women. J Hum Hypertens 26: 585-593.
10. Rao CR, Kamath VG1, Shetty A1, Kamath A1 (2012) High blood pressure prevalence and significant correlates: a quantitative analysis from coastal karnataka, India. ISRN Prev Med 2013: 574973.
11. S. Sidhu, K. Kumari and Prabhjot (2005); Socio-demographic Variables of Hypertension Among Adult Punjabi Females. J Hum Ecol 17: 211-215.
12. Hunt SC, Stephenson SH, Hopkins PN, Williams RR (1991) Predictors of an increased risk of future hypertension in Utah. A screening analysis. Hypertension 17: 969-976.
13. Zachariah MG, Thankappan KR, Alex SC, Sarma PS, Vasan RS (2003) Prevalence, correlates, awareness, treatment, and control of hypertension in a middle-aged urban population in Kerala. Indian Heart J 55: 245-251.
14. Hu G, Barengo NC, Tuomilehto J, Lakka TA, Nissinen A, et al. (2004) Relationship of physical activity and body mass index to the risk of hypertension: a prospective study in Finland. Hypertension 43: 25-30.
15. Kokkinos PF, Giannelou A, Manolis A, Pittaras A (2009) Physical activity in the prevention and management of high blood pressure. Hellenic J Cardiol 50: 52-59.
16. Autenrieth C, Schneider A, Döring A, Meisinger C, Herder C, et al. (2009) Association between different domains of physical activity and markers of inflammation. Med Sci Sports Exerc 41: 1706-1713.
17. Khaing Nang EE, Khoo EY, Salim A, Tai ES, Lee J, et al. (2010) Patterns of physical activity in different domains and implications for intervention in a multi-ethnic Asian population: a cross-sectional study. BMC Public Health 10: 644.
18. He XZ, Baker DW (2005) Differences in leisure-time, household, and work-related physical activity by race, ethnicity, and education. J Gen Intern Med 20: 259-266.
19. Jang TW, Park SG, Kim HR, Kim JM, Hong YS, et al. (2012) Estimation of maximal oxygen uptake without exercise testing in Korean healthy adult workers. Tohoku J Exp Med 227: 313-319.
20. Bhammar DM, Angadi SS, Gaesser GA (2012) Effects of fractionized and continuous exercise on 24-h ambulatory blood pressure. Med Sci Sports Exerc 44: 2270-2276.

21. Quinn TJ, Klooster JR, Kenefick RW (2006) Two short, daily activity bouts vs. one long bout: are health and fitness improvements similar over twelve and twenty-four weeks?: J Strength Cond Res 20: 130-135.

22. Leino-Arjas P, Solovieva S, Riihimäki H, Kirjonen J, Telama R (2004) Leisure time physical activity and strenuousness of work as predictors of physical functioning: a 28 year follow up of a cohort of industrial employees. Occup Environ Med 61: 1032-1038.

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